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EXAMINER	
WEST, JEFFREY R	

ART UNIT	PAPER NUMBER
2857	

DATE MAILED: 04/18/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)
	09/686,663	ALEXANDER, JAY A.
	Examiner	**Art Unit**
	Jeffrey R. West	2857

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 03 April 2006.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 66-103 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 66-103 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 30 September 2004 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 66-69, 80-84, and 95-99 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent No. 6,263,290 to Williams et al.

With respect to claims 66, 81, and 96, Williams discloses a signal measurement system, and corresponding method, comprising a pulse management system configured to generate at least one pulse measurement of a particular pulse measurement type (column 3, lines 29-30 and column 12, lines 32-43) for each of a plurality of pulses in a time-varying analog signal stored in an acquisition memory (column 6, line 63 to column 7, line 15), calculate at least one measurement statistic for the particular pulse measurement type, wherein the at least one measurement statistic is calculated using the generated at least one pulse measurement of the particular pulse measurement type for at least two of the plurality of pulses and store the at least one pulse measurement and the at least one measurement statistic (column 7, lines 36-37 and column 12, lines 32-50).

With respect to claim 67, Williams discloses that the signal measurement system comprises an oscilloscope (column 5, lines 50-52).

With respect to claims 68, 83, and 98, Williams discloses that at least one of the measurement statistics comprise one or more of the group consisting of mean, mode, median, and standard deviation (column 12, lines 34-38).

With respect to claims 69, 84, and 99, Williams discloses that the at least one pulse measurement comprise pulse width (column 12, lines 38-40).

With respect to claims 80 and 95, Williams discloses that the pulse measurement statistics are generated in accordance with at least one measurement parameter provided by an operator (column 8, lines 9-30 and column 15, lines 29-38).

With respect to claims 82 and 97, Williams discloses that the system receives the time-varying analog signal and displays a waveform of at least one pulse of the time-varying analog signal (column 1, lines 23-65 and Figures 20 and 21).

Williams also discloses that the pulse measurement is generated based on an indication of a type of pulse (i.e. channel slope and polarity) (column 8, lines 9-30).

Williams further discloses means/method for generating a histogram using a table stored in memory that lists a quantity of sampled occurrences of when the analog signal attained each of a plurality of signal levels (column 16, line 62 to column 17, line 28) wherein the analog signal is a voltage signal and wherein the signal levels represented in the histogram are voltage levels (column 3, lines 38-47 and column 3, line 66 to column 4, line 3).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 70-78, 85-93, and 100-103 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams in view of U.S. Patent No. 5,003,248 to Johnson.

As noted above, the invention of Williams teaches many of the features of the claimed invention and while the invention of Williams does teach analyzing a plurality of pulse measurement through the generation of a histogram, Williams does not provide all of the corresponding methods for creating such a histogram.

Johnson teaches a probability density histogram display for use as a pulse management system including a digital oscilloscope that obtains an analog time-varying pulse signal, buffers and applies the signal to a sampling bridge that samples the input signal in a single acquisition and measures a voltage characteristic of each of the pulses in series before passing the voltage value to a holding circuit and an ADC that digitizes the voltage levels and stores the digitized voltage samples in a memory with each sample uniquely identified by a single digital word identifier (column 3, lines 19-31). Johnson then discloses a means for automatically using the previously obtained/stored values to form a histogram (i.e. a histogrammer) (column 3, lines 31-37) of a distribution of the number of occurrences

that the analog signal attained each of a plurality of signal levels (column 1, lines 63-68).

Johnson teaches a mode finder configured to identify one or more modes of the histogram representing one or more signal levels that occur most frequently in the histogram (column 4, lines 17-24).

Johnson teaches a transition calculator configured to determine a transition signal level at each of one or more transition percentages, wherein each of the one or more transition percentages is a percentage of a difference between two of the signal levels (column 1, lines 34-45 and column 4, lines 24-30).

Johnson teaches a data analyzer configured to process the pulse measurements to determine transition times at which each of the plurality of pulses attains each of the transition signal levels (i.e. the corresponding time of occurrence with respect to the other pulses indicating the time corresponding to when a rising-edge trigger event caused the storage of the signal) (column 5, lines 21-30) and generating the histogram utilizing the transition times as part of a memory (column 4, lines 34-44 and column 5, lines 41 to column 6, line 22).

Johnson teaches that the analog signal is a voltage signal, and wherein the signal levels represented in the histogram are voltage levels (column 1, line 63-68).

Johnson teaches that the acquisition memory stores data pertaining to a plurality of analog signals each with corresponding graphs of user-selected pulse waveforms on a single display (column 3, lines 51-54). Further, since the invention of Johnson teaches displaying a plurality of data graphs corresponding to a plurality of input

sources, wherein the histogram display for each source is optional (abstract) it is considered inherent that the source must provide some type of measurement parameter based on a user indicating to the processing system memory that the histogram is to be calculated and displayed.

Johnson teaches that the mode finder utilizes an indication to identify a number of modes of the histogram, and wherein the indication is an indication of the number of signal levels of the acquired signals which have a logical representation (i.e. digital values stored in the memory indicating the number of occurrences) (column 4, lines 17-24).

It would have been obvious to on having ordinary skill in the art to modify the invention of Williams to specifically include a means for further analyzing the pulses according to a calculated histogram using the specific method, as taught by Johnson, because Williams does teach analyzing a plurality of pulse measurement through the generation of a histogram and Johnson suggests a corresponding method with all of the relevant details required to produce the histogram of Williams in a method that would have improved the pulse analysis by providing means for determining the frequency of occurrence of amplitude levels thereby allowing the processing of the pulses for timing analysis (column 1, lines 29-45).

With respect to claims 78 and 93, the limitation requiring that the acquired signal be an alternative mark inversion communication signal that transitions between three signal values, is considered to be an intended use limitation. A recitation of the intended use of the claimed invention must result in a structural difference between

the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967) and *In re Otto*, 136 USPQ 458, 459 (CCPA 1963). In the instant case, the structure of Williams and Johnson is capable of analyzing an alternative mark inversion communication input signal. Therefore, as understood by one having ordinary skill in the art, and admitted by Applicant on page 27, lines 29-30, the mode finder of Williams and Johnson would identify all the modes of the histogram corresponding to the acquired signal, such as three modes for an alternative mark inversions signal. Further, it is considered inherent that that an alternate mark inversion signal transitions between three signal values (see the supplied definition AMI).

5. Claims 79 and 94 are rejected under 35 U.S.C. 103(a) as being unpatentable over Williams in view of Johnson and further in view of U.S. Patent No. 5,410,617 to Kidd et al.

As noted above, the invention of Williams and Johnson teaches all the features of the claimed invention except for including a smoothing function to identify any of the one or more modes of the histogram.

Kidd teaches a method for adaptively thresholding grayscale image data by obtaining the image data and mapping the data in a histogram, using a look-up

table, and incorporating a smoothing function (column 8, lines 37-54) to find peaks in the histogram (column 9, lines 13-15).

It would have been obvious to one having ordinary skill in the art to modify the invention of Williams and Johnson to include a smoothing function to identify any of the one or more modes of the histogram, as taught by Kidd, because Williams and Johnson does teach that the peaks of the histogram correspond to the modes of the histogram and Kidd suggests that the combination would have provided better peak/mode detection by removing very small peaks and rapid excursions in the histogram (column 8, lines 64-65).

Response to Arguments

6. Applicant's arguments filed April 03, 2006, have been fully considered but they are not persuasive.

Applicant argues:

> Williams is directed to achieving highly accurate measurements for electrical waveforms. The portion of Williams relied upon by the Examiner recites, "[l]ocally synthesized data, which may be pre-stored is selected in step 31." (See, Williams, col. 7, ll. 36-37.) This "locally synthesized data" is a synthesized ideal waveform used to view the results of different filters, and to validate the applicability of selected parameters. (See, Williams, col. 7, 44-45, col. 14, ll. 62-64.) As such, this "locally synthesized data" of Williams is neither pulse measurements nor measurement statistics. Rather, it is merely a synthesized ideal waveform.
>
> The Examiner also cited to col. 12, lines 32-50 of Williams. This portion of Williams, however, does not disclose storing any data. Rather, this portion discloses sample displays that may include statistical analysis data, such as minimum values, maximum values, mean values, etc. In fact, not only does this portion fail to disclose storing any data, it doesn't event disclose displaying pulse measurements. Thus, this portion likewise fails to disclose storing both pulse measurements and at least one measurement statistic.

> Applicant therefore respectfully submit that Williams fails to teach or suggest "stor[ing] the generated pulse measurements and the at least one measurement statistic," as recited by claim 66. Applicants therefore respectfully request that the Examiner reconsider and withdraw the rejection of claim 66 for at least this reason.

Applicant also provides similar arguments with respect to independent claims 81 and 96.

The Examiner maintains that the invention of Williams discloses:

> FIGS. 12-16 illustrate sample displays which may be generated from the display results step 38 of FIG. 3, responsive to the select presentation format step 54 of FIG. 5. Each of these screens may include statistical analysis data, such as minimum value, maximum value, mean value, standard deviation, largest negative phase displacement, largest positive phase displacement, and population size. These statistics are based on the selected event of interest, for example pulse width, period, frequency, or delay. Largest negative phase displacement refers to the greatest amount that the event of interest decreased between adjacent cycles for a particular waveform. For example, if pulse width is the selected event of interest, the pulse width of each cycle is analyzed and compared with the pulse width of the preceding cycle. The greatest negative difference between any adjacent cycles within the record that represents the waveform is the largest negative slope displacement, while the greatest positive difference is the largest positive slope displacement. (column 12, lines 32-50)

The Examiner maintains that one having ordinary skill in the art would recognize that in order to calculate and display a minimum value, maximum value, mean value, standard deviation, largest negative phase displacement, largest positive phase displacement, and population size (i.e. at least one measurement statistic) based on a pulse width, period, frequency, or delay, (i.e. at least one pulse measurement) that the at least one pulse measurement and the at least one measurement must first be stored.

The Examiner also maintains that the invention of Williams specifically discloses storing the acquired data, generating a stored record, as well as storing the analyzed data comprising the measurements:

> FIG. 3 is a flowchart that describes a process in accordance with the invention. FIG. 3 may be interpreted with respect to FIG. 1. In step 30, the user or an external system sets up the analysis system. The system 2 under test provides electrical signals which are of interest. These signals, normally analog signals, are acquired by the measurement system 4 in step 32, and are converted into an information record in step 34. This information record may be in the form of a computer file, and may contain data organized as an array. Generally, the waveform is a periodic wave such as a sine wave or a sequence of pulses. Often, such a waveform contains characteristics which make the waveform imperfect, such as peak variations in amplitudes or pulse widths. A sequence of pulses is a time series in which the signal voltage alternates between a high voltage and a low voltage. Ideally, such a waveform is a perfect pulse train. However, characteristics may vary, especially at very high frequencies. These characteristics include frequency variations, pulse width variations, period variations, and the like. (column 6, line 63 to column 7, line 15)
>
> The information record generated in step 34 includes a series of voltages represented as discrete digital signals of a number of bits commonly referred to as a word. The series of digital words may also be called samples. Each of the samples in the series is associated with a time at which the waveform was converted into one of the samples. For example, if the measurement system 4 is set to a sampling rate of 2 GHz, then an exemplary record ideally would include a sequential list of 250,000 samples, corresponding to 250,000 voltages measured over a period of 125 microseconds. The number of actual points in a record, however, is dependent upon several factors. In the example, each subsequent sample in the sequential list would represent the voltage measured 0.5 nanoseconds after the previous voltage. The analysis system analyzes the record in step 36, and displays the results in step 38. FIG. 29 also shows an example of a record of discrete voltages. (column 7, lines 16-32)
>
> Referring back to FIG. 3, steps 32 and 34 of acquiring data and converting the data to a digital record may utilize any conventional method. Further detail of step 36, analyzing the digital record, is shown in FIG. 7. FIG. 7 shows step 72 of receiving the record, which is a list of voltages, and step 74 of determining the average sample rate. The inverse of the average sample rate is the amount of time between two adjacent samples within the record. In step 76, the upsample rate is determined, which is dependent upon the type of filter selected. The upsample rate is also referred to as the interpolation ratio. A time tag for each

> event of interest within the record is determined in step 78. An example of an event of interest is a voltage or a current threshold crossing with a positive slope. In this example, the time tag list generated in step 79 would include a list of times, each time representing the relative time at which the waveform of interest crossed the selected voltage threshold while increasing, i.e. with positive slope. The time tag list is used to display results as in step 38 of FIG. 3, which will be discussed in more detail below. (column 8, lines 44-63)

The Examiner also notes that while independent claim 66 does not require "displaying pulse measurements" as argued by Applicant, the invention of Williams does disclose such a display of the stored pulse measurements (column 13, lines 4-13):

> FIG. 14 shows a time-series view in a text format. This allows the values associated with individual events of interest to be viewed. Furthermore, the text data may be imported into a text file or other computer files for use in analysis programs, diagnostic programs, or for spreadsheet analysis. In addition to the text data output which contains the time tag data, additional text data outputs may be generated that contain the results displayed on any of the screens. For example, the text file may contain minimum, maximum, and average values for the parameters of interest.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to Applicant's disclosure:

U.S. Patent No. 6,018,245 to Villa et al. teaches a method and apparatus for detection and acquisition of automotive fuel injector voltage signal pulse widths including means for generating a histogram and determining an average pulse width from acquired data.

U.S. Patent No. 6,453,250 to Andersson et al. teaches a method and apparatus for detection of missing pulses from a pulse train.

U.S. Patent No. 4,908,784 to Box et al. teaches a method and apparatus for asynchronous time measurement.

U.S. Patent No. 6,418,386 to Wong-Lam et al. teaches high and low voltage measurement in waveform analysis and teaches well-known max-min and histogram methods.

U.S. Patent No. 3,656,060 to Bauernfeind et al. teaches a time interval measuring and accumulating device, such as an oscilloscope (column 1, lines 7-9), wherein the user of the oscilloscope specifies the input pulses as either positive or negative pulses before pulse processing occurs (column 2, lines 45-47).

U.S. Patent No. 5,495,168 to de Vries teaches a signal measurement system comprising a pulse management system configured to automatically generate at least one pulse measurement of a particular pulse measurement type (i.e. amplitudes) (column 3, lines 9-14 and 35-40) for each of a plurality of pulses in a time-varying analog signal stored in an acquisition memory (column 2, lines 53-67), generate at least one measurement statistic (i.e. global max and min) for the particular pulse measurement type (column 3, lines 51-53), wherein the at least one measurement statistic is generated using the generated pulse measurements of the particular pulse measurement type for at least some of the plurality of pulses, and store the generated pulse measurement results and measurement statistics in a searchable data structure (column 3, lines 1-4).

U.S. Patent No. 5,222,028 to LaBarre et al. teaches a pulse analysis/management system, including a digital oscilloscope (column 6, lines 54-58) that obtains a time-varying analog pulse signal (column 3, lines 67-68), digitizes and stores the samples in an acquisition memory during a single acquisition (column 7, lines 7-16 and 24-29) and automatically/without operator involvement provides measured characteristics of each of the previously stored plurality of pulses for storage in a searchable data storage array, suitable for an implementing application (column 9, lines 44-52), using positive and negative pulse time indications (column 11, lines 33-38). LaBarre also discloses a transition calculator that determines operator-provided transition signal levels and times at each of one or more transition percentages, wherein each percentage is a percentage of a difference between two signal levels (top and base) having a logical interpretation for comparison (column 9, line 52 to column 10, line 9 and column 12, lines 60-66).

LaBarre also teaches that the measured characteristics stored in a searchable data storage array comprise results of pulse measurements taken of each of the plurality of pulses (i.e. voltage) (column 4, lines 34-49) as well as pulse global measurement statistics comprising results of statistical analyses (i.e. mean) of at least one of the pulse measurements (i.e. DC offset) (column 7, line 61 to column 8, line 6).

LaBarre also teaches storing a plurality of measurement characteristics in a searchable array, in response to the acquisition memory storing the acquired signal (column 9, lines 41-45 and column 12, lines 47-66), that is accessed by a user

entering a particular pulse number (column 4, lines 7-11) as well as presenting the pulse characteristics in a signal pulses data table that comprises a pulse identifier identifying each pulse of the acquired signal as a relative occurrence with respect to the other pulses in the sequence in which they occur (i.e. sequential pulse numbers) and a plurality of pulse measurement results associated with each said pulse identifier (column 4, TABLEs 1 and 2).

LaBarre also teaches populating the data structure with pulse measurement data in accordance with measurement parameters provided by an operator through a user interface (column 4, lines 7-11 and 50-53).

http://www.erg.abdn.ac.uk/users/gorry/course/phy-pages/ami.html provides the definition of "alternate mark inversion"

8. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jeffrey R. West whose telephone number is (703)308-1309. The examiner can normally be reached on Monday through Friday, 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on (703)308-1677. The fax phone numbers for the organization where this application or proceeding is assigned are (703)308-7382 for regular communications and (703)308-7382 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

jrw

April 12, 2006

Marc S. Hoff
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